

SEQUENCE LISTING

<110> DEWOLF, WALTER E. JR  
KALLENDER, HOWARD  
LONSDALE, JOHN T.

<120> METHODS FOR MAKING AND USING FATTY ACID  
SYNTHESIS PATHWAY REAGENTS

<130> GM50068

<140> TO BE ASSIGNED

<141> 2002-03-25

<150> PCT/US00/29451

<151> 2000-10-26

<150> 60/161,775

<151> 1999-10-27

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<213> Staphylococcus aureus

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Asp Phe Asp Ile Leu Glu Thr Met Phe Thr Asp Glu Glu Gly Lys Leu
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 Val Met Pro Leu Ala Val Ser Gly Pro Phe His Ser Ser Leu Met Lys  
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 Val Ile Glu Glu Asp Phe Ser Ser Tyr Ile Asn Gln Phe Glu Trp Arg  
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 Val Gln Phe Ile Asn Ser Thr Glu Trp Leu Ile Asp Gln Gly Val Asp  
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<213> Staphylococcus aureus

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<213> Staphylococcus aureus

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Val	Val	Glu	Lys	Ala	Asn	Leu	Thr	Ser	Asp	Asp	Ile	Asp	Leu	Phe	Ile
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Leu	Lys	Asp	Asp	Asp	Thr	Ile	Val	Leu	Val	Gly	Phe	Gly	Gly	Gly	Leu			
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 35 40 45  
 Tyr Glu Glu Gly Gln Arg Cys Val Ala Ile Lys Gln Val Ser Gly Asn  
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Val	Leu	Ile	Thr	Glu	Ala	Leu	Ala	Gln	Thr	Gly	Ala	Val	Ala	Ile	Leu
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Asn	Ser	Glu	Glu	Asn	Lys	Gly	Lys	Ile	Ala	Leu	Phe	Ala	Gly	Ile	Asp
				100				105					110		
Lys	Cys	Arg	Phe	Lys	Arg	Gln	Val	Val	Pro	Gly	Asp	Thr	Leu	Thr	Leu
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Phe	Ala	Asn	Met	Glu	Asp	Leu	Arg	Gly	Arg	Phe	Ser	Glu	Thr	Ser	Arg
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<213> Staphylococcus aureus

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tatgggtacta cagggtgatgc ttatcatatt acagcgccag ctccagaagg tgaaggcggt 840
tctagagcaa tgcaagcagc tatggatgat gctgggtattg aacctaaaga tgtacaatac 900
ttaaatgccc atggtacaag tactcctgtt ggtgacttaa atgaagttaa agctattaaa 960
aatacatttg gtgaagcagc taaacactta aaagttagct caacaaaatc aatgactggg 1020
cacttacttg gtgcaacagg tggaattgaa gcaatcttct cagcgctttc aattaaagac 1080
tctaaagtcg caccgacaat acatgcggta acaccagacc cagaatgtga tttggatatt 1140
gttccaaatg aagcgcaaga ccttgatatt acttatgcaa tgagtaatag cttaggattc 1200
ggtggacata acgcagtatt agtattcaag aaatttgaag cataa 1245
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<210> 14

<211> 414

<212> PRT

<213> *Staphylococcus aureus*

<400> 14

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  1              5              10              15
Pro Ile Gly Asn Asp Val Lys Thr Thr Trp Glu Asn Ala Leu Lys Gly
      20              25              30
Val Asn Gly Ile Asp Lys Ile Thr Arg Ile Asp Thr Glu Pro Tyr Ser
      35              40              45
Val His Leu Ala Gly Glu Leu Lys Asn Phe Asn Ile Glu Asp His Ile
      50              55              60
Asp Lys Lys Glu Ala Arg Arg Met Asp Arg Phe Thr Gln Tyr Ala Ile
65              70              75              80
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Val	Ala	Ala	Arg	Glu	Ala	Val	Lys	Asp	Ala	Gln	Leu	Asp	Ile	Asn	Asp			
																85	90	95
Asn	Thr	Ala	Asp	Arg	Ile	Gly	Val	Trp	Ile	Gly	Ser	Gly	Ile	Gly	Gly			
																100	105	110
Met	Glu	Thr	Phe	Glu	Ile	Ala	His	Lys	Gln	Leu	Met	Asp	Lys	Gly	Pro			
																115	120	125
Arg	Arg	Val	Ser	Pro	Phe	Phe	Val	Pro	Met	Leu	Ile	Pro	Asp	Met	Ala			
																130	135	140
Thr	Gly	Gln	Val	Ser	Ile	Asp	Leu	Gly	Ala	Lys	Gly	Pro	Asn	Gly	Ala			
																145	150	155
Thr	Val	Thr	Ala	Cys	Ala	Thr	Gly	Thr	Asn	Ser	Ile	Gly	Glu	Ala	Phe			
																165	170	175
Lys	Ile	Val	Gln	Arg	Gly	Asp	Ala	Asp	Ala	Met	Ile	Thr	Gly	Gly	Thr			
																180	185	190
Glu	Ala	Pro	Ile	Thr	His	Met	Ala	Ile	Ala	Gly	Phe	Ser	Ala	Ser	Arg			
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Ala	Leu	Ser	Thr	Asn	Asp	Asp	Ile	Glu	Thr	Ala	Cys	Arg	Pro	Phe	Gln			
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Glu	Gly	Arg	Asp	Gly	Phe	Val	Met	Gly	Glu	Gly	Ala	Gly	Ile	Leu	Val			
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Ile	Glu	Ser	Leu	Glu	Ser	Ala	Gln	Ala	Arg	Gly	Ala	Asn	Ile	Tyr	Ala			
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Glu	Ile	Val	Gly	Tyr	Gly	Thr	Thr	Gly	Asp	Ala	Tyr	His	Ile	Thr	Ala			
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Pro	Ala	Pro	Glu	Gly	Glu	Gly	Gly	Ser	Arg	Ala	Met	Gln	Ala	Ala	Met			
																275	280	285
Asp	Asp	Ala	Gly	Ile	Glu	Pro	Lys	Asp	Val	Gln	Tyr	Leu	Asn	Ala	His			
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Gly	Thr	Ser	Thr	Pro	Val	Gly	Asp	Leu	Asn	Glu	Val	Lys	Ala	Ile	Lys			
																305	310	315
Asn	Thr	Phe	Gly	Glu	Ala	Ala	Lys	His	Leu	Lys	Val	Ser	Ser	Thr	Lys			
																325	330	335
Ser	Met	Thr	Gly	His	Leu	Leu	Gly	Ala	Thr	Gly	Gly	Ile	Glu	Ala	Ile			
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Phe	Ser	Ala	Leu	Ser	Ile	Lys	Asp	Ser	Lys	Val	Ala	Pro	Thr	Ile	His			
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Ala	Val	Thr	Pro	Asp	Pro	Glu	Cys	Asp	Leu	Asp	Ile	Val	Pro	Asn	Glu			
																370	375	380
Ala	Gln	Asp	Leu	Asp	Ile	Thr	Tyr	Ala	Met	Ser	Asn	Ser	Leu	Gly	Phe			
																385	390	395
																		400

Gly Gly His Asn Ala Val Leu Val Phe Lys Lys Phe Glu Ala  
 405 410

<210> 15  
 <211> 975  
 <212> DNA  
 <213> Streptococcus pneumoniae

<400> 15  
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 cgacaaaggc atattttcaag aacagaatct accagtgatt tggctacaga gggtgctaag 180  
 aaactgatgg caaaagctgg aataacagga aaagaactgg attttatcat cctagctacc 240  
 attactccag attcgatgat gccctctaca gctgctcgtg ttcaagctaa tattggcgct 300  
 aataaagcct ttgcttttga cttaaccgcg gcttgcagtg gatttgtatt tgctctttca 360  
 actgctgaaa agtttatcgc ttctggtcgc tttcaaaaag gcttggtgat tggtagtgaa 420  
 accctctcta aggcagtcga ttggtcggat cgatcaacag ctgtgttggt tggagatggc 480  
 gctgggtggg tcttggttaga agctagcgag caagagcatt tcttagctga gagtcttaat 540  
 agcgatggaa gtcgcagcga gtgtttaact tatgggcatt caggtttgca ttctccattt 600  
 tcagatcaag aaagtgcaga ttcgtttttg aagatggatg gacgcacagt ctttgatttt 660  
 gccattcgag atgtagccaa gtctatcaag cagactattg atgaatctcc tatagaggtg 720  
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 agaaaaattg gtgttgaccg agccaaactt ccagccaata tgatggaata tggcaatacc 840  
 agtgcagcca gtatcccgat tttactttca gagtgtgtag aacaaggtct catcccttta 900  
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 attcttaciaa tttag 975

<210> 16  
 <211> 324  
 <212> PRT  
 <213> Streptococcus pneumoniae

<400> 16  
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 20 25 30  
 Trp Ile Ser Ser Arg Thr Gly Ile Arg Gln Arg His Ile Ser Arg Thr  
 35 40 45

Glu Ser Thr Ser Asp Leu Ala Thr Glu Val Ala Lys Lys Leu Met Ala  
 50 55 60  
 Lys Ala Gly Ile Thr Gly Lys Glu Leu Asp Phe Ile Ile Leu Ala Thr  
 65 70 75 80  
 Ile Thr Pro Asp Ser Met Met Pro Ser Thr Ala Ala Arg Val Gln Ala  
 85 90 95  
 Asn Ile Gly Ala Asn Lys Ala Phe Ala Phe Asp Leu Thr Ala Ala Cys  
 100 105 110  
 Ser Gly Phe Val Phe Ala Leu Ser Thr Ala Glu Lys Phe Ile Ala Ser  
 115 120 125  
 Gly Arg Phe Gln Lys Gly Leu Val Ile Gly Ser Glu Thr Leu Ser Lys  
 130 135 140  
 Ala Val Asp Trp Ser Asp Arg Ser Thr Ala Val Leu Phe Gly Asp Gly  
 145 150 155 160  
 Ala Gly Gly Val Leu Leu Glu Ala Ser Glu Gln Glu His Phe Leu Ala  
 165 170 175  
 Glu Ser Leu Asn Ser Asp Gly Ser Arg Ser Glu Cys Leu Thr Tyr Gly  
 180 185 190  
 His Ser Gly Leu His Ser Pro Phe Ser Asp Gln Glu Ser Ala Asp Ser  
 195 200 205  
 Phe Leu Lys Met Asp Gly Arg Thr Val Phe Asp Phe Ala Ile Arg Asp  
 210 215 220  
 Val Ala Lys Ser Ile Lys Gln Thr Ile Asp Glu Ser Pro Ile Glu Val  
 225 230 235 240  
 Thr Asp Leu Asp Tyr Leu Leu Leu His Gln Ala Asn Asp Arg Ile Leu  
 245 250 255  
 Asp Lys Met Ala Arg Lys Ile Gly Val Asp Arg Ala Lys Leu Pro Ala  
 260 265 270  
 Asn Met Met Glu Tyr Gly Asn Thr Ser Ala Ala Ser Ile Pro Ile Leu  
 275 280 285  
 Leu Ser Glu Cys Val Glu Gln Gly Leu Ile Pro Leu Asp Gly Ser Gln  
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 Thr Val Leu Leu Ser Gly Phe Gly Gly Gly Leu Thr Trp Gly Thr Leu  
 305 310 315 320  
 Ile Leu Thr Ile

<210> 17

<211> 483

<212> DNA

<213> Streptococcus pneumoniae

<400> 17

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gaccgtgtct tggaagtgag cgaggatacc attgttgcta tcaaaaatgt gaccatcaac 180
gagcctttct ttaacggcca ctttcctcaa taccaggtta tgccaggtgt tgtgattatg 240
gaagccttgg cgcaaactgc cgggtgtgtg gagttatcaa aacctgaaaa taaaggaaaa 300
ctgggtctttt acgctgggtat ggacaagggt aagttcaaga agcaagttgt accaggcgac 360
caattgggtta tgacagcgac ttttgtaaaa cgtcgtggca ccatagctgt ggttgaagca 420
aaggctgaag tggatggcaa gcttgcagcc agtggtaccc ttacttttgc aattgggaac 480
taa 483
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<210> 18

<211> 160

<212> PRT

<213> Streptococcus pneumoniae

<400> 18

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Met Gly Ser Ser His His His His His His Ser Ser Gly Leu Val Pro
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Arg Gly Ser His Met Ile Asp Ile Gln Gly Ile Lys Glu Ala Leu Pro
 20          25          30
His Arg Tyr Pro Met Leu Leu Val Asp Arg Val Leu Glu Val Ser Glu
 35          40          45
Asp Thr Ile Val Ala Ile Lys Asn Val Thr Ile Asn Glu Pro Phe Phe
 50          55          60
Asn Gly His Phe Pro Gln Tyr Pro Val Met Pro Gly Val Val Ile Met
 65          70          75          80
Glu Ala Leu Ala Gln Thr Ala Gly Val Leu Glu Leu Ser Lys Pro Glu
 85          90          95
Asn Lys Gly Lys Leu Val Phe Tyr Ala Gly Met Asp Lys Val Lys Phe
100          105          110
Lys Lys Gln Val Val Pro Gly Asp Gln Leu Val Met Thr Ala Thr Phe
115          120          125
Val Lys Arg Arg Gly Thr Ile Ala Val Val Glu Ala Lys Ala Glu Val
130          135          140
Asp Gly Lys Leu Ala Ala Ser Gly Thr Leu Thr Phe Ala Ile Gly Asn
145          150          155          160
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<210> 19

<211> 1296

<212> DNA

<213> Streptococcus pneumoniae

<400> 19

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ccagaagaat tttggaatag tttagcaact gggaaaatcg gcattggtgg cattacaaaa 180
tttgatcata gtgactttga tgtgcataat gcggcagaaa tccaagattt tccgttcgat 240
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gcagcccaag aggctgtaaa tcatgccaat cttgatgtag aggctcttaa tagggatcgt 360
tttggtgtta tcgttgcac tgggtattggt ggaatcaagg aaattgaaga tcaggtactt 420
cgccttcatg aaaaaggacc caaacgtgtc aaaccaatga ctcttccaaa agctttacca 480
aatatggctt ctgggaatgt agccatgcgt tttggtgcaa acggtgtttg taaatctatc 540
aatactgcct gctcttcac aaatgatgcg attggggatg ccttccgctc cattaagttt 600
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gctgcgggtg cagtagaagc tatcgtcacc atcgaagcta tgcgtcataa ctttgtacca 1140
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<210> 20

<211> 431

<212> PRT

<213> Streptococcus pneumoniae

<400> 20

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1

5

10

15

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20	25	30	
Val Thr Ser Pro Ile Gly Asn Thr Pro Glu Glu Phe Trp Asn Ser Leu			
35	40	45	
Ala Thr Gly Lys Ile Gly Ile Gly Gly Ile Thr Lys Phe Asp His Ser			
50	55	60	
Asp Phe Asp Val His Asn Ala Ala Glu Ile Gln Asp Phe Pro Phe Asp			
65	70	75	80
Lys Tyr Phe Val Lys Lys Asp Thr Asn Arg Phe Asp Asn Tyr Ser Leu			
85	90	95	
Tyr Ala Leu Tyr Ala Ala Gln Glu Ala Val Asn His Ala Asn Leu Asp			
100	105	110	
Val Glu Ala Leu Asn Arg Asp Arg Phe Gly Val Ile Val Ala Ser Gly			
115	120	125	
Ile Gly Gly Ile Lys Glu Ile Glu Asp Gln Val Leu Arg Leu His Glu			
130	135	140	
Lys Gly Pro Lys Arg Val Lys Pro Met Thr Leu Pro Lys Ala Leu Pro			
145	150	155	160
Asn Met Ala Ser Gly Asn Val Ala Met Arg Phe Gly Ala Asn Gly Val			
165	170	175	
Cys Lys Ser Ile Asn Thr Ala Cys Ser Ser Ser Asn Asp Ala Ile Gly			
180	185	190	
Asp Ala Phe Arg Ser Ile Lys Phe Gly Phe Gln Asp Val Met Leu Val			
195	200	205	
Gly Gly Thr Glu Ala Ser Ile Thr Pro Phe Ala Ile Ala Gly Phe Gln			
210	215	220	
Ala Leu Thr Ala Leu Ser Thr Thr Glu Asp Pro Thr Arg Ala Ser Ile			
225	230	235	240
Pro Phe Asp Lys Asp Arg Asn Gly Phe Val Met Gly Glu Gly Ser Gly			
245	250	255	
Met Leu Val Leu Glu Ser Leu Glu His Ala Glu Lys Arg Gly Ala Thr			
260	265	270	
Ile Leu Ala Glu Val Val Gly Tyr Gly Asn Thr Cys Asp Ala Tyr His			
275	280	285	
Met Thr Ser Pro His Pro Glu Gly Gln Gly Ala Ile Lys Ala Ile Lys			
290	295	300	
Leu Ala Leu Glu Glu Ala Glu Ile Ser Pro Glu Gln Val Ala Tyr Val			
305	310	315	320
Asn Ala His Gly Thr Ser Thr Pro Ala Asn Glu Lys Gly Glu Ser Gly			
325	330	335	

Ala	Ile	Val	Ala	Val	Leu	Gly	Lys	Glu	Val	Pro	Val	Ser	Ser	Thr	Lys
340					345					350					
Ser	Phe	Thr	Gly	His	Leu	Leu	Gly	Ala	Ala	Gly	Ala	Val	Glu	Ala	Ile
355					360					365					
Val	Thr	Ile	Glu	Ala	Met	Arg	His	Asn	Phe	Val	Pro	Met	Thr	Ala	Gly
370					375					380					
Thr	Ser	Glu	Val	Ser	Asp	Tyr	Ile	Glu	Ala	Asn	Val	Val	Tyr	Gly	Gln
385					390					395					400
Gly	Leu	Glu	Lys	Glu	Ile	Pro	Tyr	Ala	Ile	Ser	Asn	Thr	Phe	Gly	Phe
405					410					415					
Gly	Gly	His	Asn	Ala	Val	Leu	Ala	Phe	Lys	Arg	Trp	Glu	Asn	Arg	
420					425					430					

<210> 21

<211> 1273

<212> DNA

<213> Escherichia coli

<400> 21

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tgcggtagca ggacgctgcc agcgaactcg cagtttgcaa gtgacgggtat ataaccgaaa 180
agtgactgag cgtacatgta tacgaagatt attggtactg gcagctatct gcccgaacaa 240
gtgcggacaa acgccgattt ggaaaaaatg gtggacacct ctgacgagtg gattgtcact 300
cgtaccggtg tccgcgaacg ccacattgcc gcgccaaacg aaaccgtttc aaccatgggc 360
tttgaagcgg cgacacgcgc aattgagatg gcgggcattg agaaagacca gattggcctg 420
atcgttgtgg caacgacttc tgctacgcac gctttcccga gcgcagcttg tcagattcaa 480
agcatgttgg gcattaaagg ttgcccggca ttgacgctg cagcagcctg cgcaggtttc 540
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gtcgtcgggt ccgatgtact ggcgcgccac tgcgatccaa ccgatcgtgg gactattatt 660
atTTTTTggcg atggcgcggg cgctgcggtg ctggctgcct ctgaagagcc gggaatcatt 720
tccacccatc tgcatgccga cggtagttat ggtgaattgc tgacgctgcc aaacgccgac 780
cgcgatgaatc cagagaattc aattcatctg acgatggcgg gcaacgaagt cttcaagggt 840
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cgtttctagg ataaggatta aaacatgacg caatttgcac ttgtgttccc tggacagggt 1200

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Leu Val Pro His Gln Ala Asn Leu Arg Ile Ile Ser Ala Thr Ala Lys  
                           245                          250                          255  
 Lys Leu Gly Met Ser Met Asp Asn Val Val Val Thr Leu Asp Arg His  
                           260                          265                          270  
 Gly Asn Thr Ser Ala Ala Ser Val Pro Cys Ala Leu Asp Glu Ala Val  
                           275                          280                          285  
 Arg Asp Gly Arg Ile Lys Pro Gly Gln Leu Val Leu Leu Glu Ala Phe  
                           290                          295                          300  
 Gly Gly Gly Phe Thr Trp Gly Ser Ala Leu Val Arg Phe  
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<210> 23  
 <211> 789  
 <212> DNA  
 <213> Escherichia coli

<400> 23  
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 aacgacaaac tgaaaggccg cgtagaagaa tttgccgctc aattgggttc tgacatcggt 180  
 ctgcagtgcg atgttgcaga agatgccagc atcgacacca tgttcgctga actggggaaa 240  
 gtttggccga aatttgacgg tttcgtacac tctattgggt ttgcacctgg cgatcagctg 300  
 gatggtgact atgttaacgc cgttaccctg gaaggcttca aaattgcca cgacatcagc 360  
 tcctacagct tcgttgcaat ggcaaaagct tgccgctcca tgctgaatcc gggttctgcc 420  
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 aaagacttcc gcaaaatgct ggctcattgc gaagccgtta ccccgattcg ccgtaccggt 660  
 actattgaag atgtgggtaa ctctgcggca ttctgtgtgt ccgatctctc tgccgggtatc 720  
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<210> 24  
 <211> 262  
 <212> PRT  
 <213> Escherichia coli

<400> 24



<400> 25

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aaagtaactg aagatgcatc tttcaaagat gatttaggcg ctgactcact tgatatcgct 120  
gaattagtaa tggaattaga agacgagttt ggtactgaaa ttcctgatga agaagctgaa 180  
aaaatcaaca ctggttggtga tgctgttaaa tttattaaca gtcttgaaaa ataa 234

<210> 26

<211> 77

<212> PRT

<213> Staphylococcus aureus

<400> 26

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Val	Asp	Ala	Asp	Lys	Val	Thr	Glu	Asp	Ala	Ser	Phe	Lys	Asp	Asp	Leu
			20					25					30		
Gly	Ala	Asp	Ser	Leu	Asp	Ile	Ala	Glu	Leu	Val	Met	Glu	Leu	Glu	Asp
		35					40					45			
Glu	Phe	Gly	Thr	Glu	Ile	Pro	Asp	Glu	Glu	Ala	Glu	Lys	Ile	Asn	Thr
	50					55					60				
Val	Gly	Asp	Ala	Val	Lys	Phe	Ile	Asn	Ser	Leu	Glu	Lys			
65					70						75				

<210> 27

<211> 234

<212> DNA

<213> Streptococcus pneumoniae

<400> 27

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ttgatggagt ttatcttgac gctggaggat gaatttagta tcgaaatcag cgatgaggaa 180  
attgaccaac tccaaagtgt aggagatgtg gttaaaatca ttcaaggaaa atag 234

<210> 28

<211> 77

<212> PRT

<213> Streptococcus pneumoniae

<400> 28

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1 5 10 15  
Arg Gln Gly Glu Asp Phe Val Val Thr Glu Ser Leu Ser Leu Lys Asp  
20 25 30  
Asp Leu Asp Ala Asp Ser Val Asp Leu Met Glu Phe Ile Leu Thr Leu  
35 40 45  
Glu Asp Glu Phe Ser Ile Glu Ile Ser Asp Glu Glu Ile Asp Gln Leu  
50 55 60  
Gln Ser Val Gly Asp Val Val Lys Ile Ile Gln Gly Lys  
65 70 75

<210> 29

<211> 225

<212> DNA

<213> Streptococcus pneumoniae

<400> 29

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gtaatctcag aaatcgaaga tgcttttgat atccaaatcg aagcagaaaa tgacttgaaa 180  
acagttggtg acttggttgc ttacgttgaa gagcaagcaa aataa 225

<210> 30

<211> 74

<212> PRT

<213> Streptococcus pneumoniae

<400> 30

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20 25 30  
Ala Asp Ser Leu Asp Leu Phe Gln Val Ile Ser Glu Ile Glu Asp Ala  
35 40 45  
Phe Asp Ile Gln Ile Glu Ala Glu Asn Asp Leu Lys Thr Val Gly Asp  
50 55 60



Leu Val Ala Tyr Val Glu Glu Gln Ala Lys  
65 70

<210> 31

<211> 951

<212> DNA

<213> Haemophilus influenzae

<400> 31

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gaacgtcgta tcgcagcgga agatgaaact gttgcaacaa tgggatttga agcggcaaaa 180
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<211> 316

<212> PRT

<213> Haemophilus influenzae

<400> 32

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Ile Val Thr Arg Ser Gly Ile Arg Glu Arg Arg Ile Ala Ala Glu Asp
        35           40           45
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Glu	Thr	Val	Ala	Thr	Met	Gly	Phe	Glu	Ala	Ala	Lys	Asn	Ala	Ile	Glu
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Thr	Ser	His	Ser	His	Ala	Tyr	Pro	Ser	Ala	Ala	Cys	Gln	Val	Gln	Gly
				85					90					95	
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			100					105					110		
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Ala	Gly	Ala	Val	Ile	Leu	Glu	Ala	Ser	Glu	Gln	Glu	Gly	Ile	Ile	Ser
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Thr	His	Leu	His	Ala	Ser	Ala	Asn	Lys	Asn	Asn	Ala	Leu	Val	Leu	Ala
			180					185						190	
Gln	Pro	Glu	Arg	Gly	Ile	Glu	Lys	Ser	Gly	Tyr	Ile	Glu	Met	Gln	Gly
		195					200					205			
Asn	Glu	Thr	Phe	Lys	Leu	Ala	Val	Arg	Glu	Leu	Ser	Asn	Val	Val	Glu
	210					215					220				
Glu	Thr	Leu	Ser	Ala	Asn	Asn	Leu	Asp	Lys	Lys	Asp	Leu	Asp	Trp	Leu
225					230					235				240	
Val	Pro	His	Gln	Ala	Asn	Leu	Arg	Ile	Ile	Thr	Ala	Thr	Ala	Lys	Lys
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Leu	Glu	Met	Asp	Met	Ser	Gln	Val	Val	Val	Thr	Leu	Asp	Lys	Tyr	Ala
			260					265				270			
Asn	Asn	Ser	Ala	Ala	Thr	Val	Pro	Val	Ala	Leu	Asp	Glu	Ala	Val	Arg
		275					280				285				
Asp	Gly	Arg	Ile	Gln	Arg	Gly	Gln	Leu	Leu	Leu	Leu	Glu	Ala	Phe	Gly
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Gly	Gly	Trp	Thr	Trp	Gly	Ser	Ala	Leu	Val	Arg	Phe				
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<211> 233

<212> DNA

<213> Escherichia coli

<400> 33

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gttgagctgg taatggctct ggagaagagt ttgatactga gattccggac gaagaagctg 180  
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<210> 34

<211> 78

<212> PRT

<213> Escherichia coli

<400> 34

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			20					25					30		
Leu	Gly	Ala	Asp	Ser	Leu	Asp	Thr	Val	Glu	Leu	Val	Met	Ala	Leu	Glu
		35					40					45			
Glu	Glu	Phe	Asp	Thr	Glu	Ile	Pro	Asp	Glu	Glu	Ala	Glu	Lys	Ile	Thr
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<210> 35

<211> 29

<212> DNA

<213> Streptococcus pneumoniae

<400> 35

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<210> 36

<211> 29

<212> DNA

<213> Streptococcus pneumoniae

<400> 36

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<210> 37

<211> 324

<212> PRT

<213> Streptococcus pneumoniae

<400> 37

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			20					25					30		
Ser	Lys	Ala	Gly	Gly	Leu	Gly	Ile	Ile	Gly	Gly	Gly	Asn	Ala	Pro	Lys
		35					40					45			
Glu	Val	Val	Lys	Ala	Asn	Ile	Asp	Lys	Ile	Lys	Ser	Leu	Thr	Asp	Lys
	50					55					60				
Pro	Phe	Gly	Val	Asn	Ile	Met	Leu	Leu	Ser	Pro	Phe	Val	Glu	Asp	Ile
65				70					75					80	
Val	Asp	Leu	Val	Ile	Glu	Glu	Gly	Val	Lys	Val	Val	Thr	Thr	Gly	Ala
			85					90						95	
Gly	Asn	Pro	Ser	Lys	Tyr	Met	Glu	Arg	Phe	His	Glu	Ala	Gly	Ile	Ile
		100					105						110		
Val	Ile	Pro	Val	Val	Pro	Ser	Val	Ala	Leu	Ala	Lys	Arg	Met	Glu	Lys
	115						120					125			
Ile	Gly	Ala	Asp	Ala	Val	Ile	Ala	Glu	Gly	Met	Glu	Ala	Gly	Gly	His
	130					135					140				
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145				150						155				160	
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			165					170						175	
Ala	Ala	Ala	Gly	Phe	Met	Leu	Gly	Ala	Glu	Ala	Val	Gln	Val	Gly	Thr
		180						185					190		
Arg	Phe	Val	Val	Ala	Lys	Glu	Ser	Asn	Ala	His	Pro	Asn	Tyr	Lys	Glu
	195						200					205			
Lys	Ile	Leu	Lys	Ala	Arg	Asp	Ile	Asp	Thr	Thr	Ile	Ser	Ala	Gln	His
	210					215					220				
Phe	Gly	His	Ala	Val	Arg	Ala	Ile	Lys	Asn	Gln	Leu	Thr	Arg	Asp	Phe
225				230						235				240	
Glu	Leu	Ala	Glu	Lys	Asp	Ala	Phe	Lys	Gln	Glu	Asp	Pro	Asp	Leu	Glu
			245							250				255	

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275 280 285  
Val Ser Lys Glu Glu Thr Ala Glu Glu Ile Leu Lys Asp Leu Tyr Tyr  
290 295 300  
Gly Ala Ala Lys Lys Ile Gln Glu Glu Ala Ser Arg Trp Ala Gly Val  
305 310 315 320  
Val Arg Asn Asp